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To: Linda Bluestein, EERE, DOE

From: Michael Wang, CTR, ANL

Subject: Revisions of the Well-to-Wheels Assessment Report on Fischer-Tropsch Diesel

Upon further examination of some of the information that was provided to DOE by the three FT diesel petition companies and that I used in my December 2001 report detailing a well-to-wheels assessment of FT diesel, I decided to revise some sections of the report and re-analyze some of the cases. The following items describe my revisions.

1. *Energy efficiency of Syntroleum's standalone FT design based on natural gas.* Syntroleum provided an energy efficiency of 49% for this design but presented an energy efficiency of 57% for the standalone FT design based on flared gas. At that time, I noticed the inconsistency and decided to use the 57% efficiency value for both cases because I did not believe that the efficiency difference between flared gas and natural gas should be this large for basically the same design and because the 57% value was consistent with what was reported in open literature. Now, I realize that by using the 57% efficiency value, the report did not represent the Syntroleum case. So, I changed the energy efficiency for this case from 57% to 49% (Syntroleum-reported efficiency).
2. *Syntroleum's standalone FT design based on flared gas.* My recent investigation of this case showed that the Syntroleum-reported efficiency of 57% for this case was originally from a previous study that I conducted. Because the energy efficiency value was not a Syntroleum-specific efficiency, I decided not to include the flared gas-based standalone case for Syntroleum in this revision.
3. *Syntroleum's steam and power co-generation case.* Syntroleum's information for this case indicated that more steam (in Btu) is generated under this case than under the case of steam co-generation only. While the Syntroleum-presented power and steam case may be possible, the generated steam under this case could be very low-quality steam; its usefulness is not clear. In the 2001 version of the report, I assumed that the steam would be used to generate electricity at a low generation efficiency (i.e., 20% efficiency). However, with that assumption, the case analyzed was not a Syntroleum case any more. Absent a Syntroleum-specific electric generation efficiency value and a steam pressure value, I decided not to include the Syntroleum's power and steam case in this revision.
4. *Product slates and feedstock inputs.* The data for FT facilities provided by the three petitioning companies indicate that each company's technology, facility design, energy feedstock inputs,

and product slate could be distinctly different. In particular, the Mossgas design seems to be intended for production of both gasoline and diesel, while the designs by Rentech and Syntroleum are for diesel production. In this revision, I added discussions regarding product slates and feedstock inputs for the designs by the three companies so that readers understand the differences.

5. *Table 2.* As a result of the above revisions, I changed and expanded Table 2. I added extended footnotes to the table to explain my decisions for certain items. I also add extensive discussions that follow Table 2 to provide readers with additional information.
6. *Case Summary.* The revised report includes five company-specific cases (see the bottom portion of Table 1). Among these, the Syntroleum standalone case with natural gas and the Mossgas standalone case with natural gas were re-simulated. The other three cases remain the same. While simulation of the Syntroleum standalone case reflects the change in energy efficiency, simulation of the Mossgas standalone case reflects different treatments of three feedstock input items (natural gas, condensate, and electricity).
7. *Tables A1 and A2.* Because of redundancies, I eliminated Tables A1 and A2 in the new version.
8. *Figures 1 through 4.* I redesigned Figures 1 through 4 for clearer presentation. The results in these four figures are the same.